

REMARKS

The Applicants sincerely appreciate the Examiner's thorough examination of the present application as evidenced by the Office Actions of June 6, 2005, and July 27, 2005. In response, the Applicants have amended Claims 1, 12-13, 16, 22-23, 36, 46, and 48 to more clearly define the claimed invention; and added new Claims 50-64. The Applicants will also show in the following remarks that all claims are patentable over U.S. Patent No. 6,475,896 to Hashimoto. Accordingly, the Applicants respectfully submit that all claims are in condition for allowance, and a Notice of Allowance is requested in due course.

Claim 1 Is Patentable Over Hashimoto

Claim 1 has been rejected under 35 U.S.C. Sec. 102(e) as being anticipated by U.S. Patent No. 6,475,896 to Hashimoto (hereinafter "Hashimoto"). Claim 1, however, is patentable over Hashimoto for at least the reasons discussed below.

As amended, Claim 1 recites a method of bumping a substrate including a metal layer thereon wherein the metal layer has an exposed portion, the method including:

- forming a barrier layer comprising a barrier layer material on the substrate and on the exposed portion of the metal layer;

- forming a conductive bump comprising a conductive bump material on the barrier layer wherein the barrier layer is between the conductive bump and the substrate and wherein the conductive bump is laterally offset and laterally separated from the exposed portion of the metal layer in a direction parallel to a surface of the substrate so that the exposed portion of metal layer is free of the conductive bump material; and

- after forming the conductive bump, removing the barrier layer from the exposed portion of the metal layer while maintaining a portion of the barrier layer between the conductive bump and the substrate so that the portion of the barrier layer maintained between the conductive bump and the substrate is laterally offset and laterally separated from the exposed portion of the metal layer in the direction parallel to the surface of the substrate and so that the exposed portion of the metal layer is free of the barrier layer material.

In rejecting Claim 1, the Office Action cites Figures 3A-D of Hashimoto and related portions of the specification. In particular, Figure 3D of Hashimoto illustrates a structure including a wafer 10, a resin layer 14, electrodes 12, chromium layers 16, copper layers 20, copper seats 24, and solder balls 26. *See*, Hashimoto, Figure 3D, and col. 9, line 56 to col. 11, line 15. In support of the rejection, the Office Action interprets: the copper layer(s) 20 of

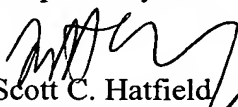
Hashimoto as a barrier layer; the chromium layer(s) 16 of Hashimoto as a metal layer; and the solder ball(s) 26 of Hashimoto as a conductive bump. As shown in Figure 3D, however, neither of the chromium layers 16 (interpreted as metal layers) of Hashimoto is free of the copper layers 20 or the solder balls 26. Accordingly, Hashimoto fails to teach or suggest a metal layer being free of a conductive bump material, or free of a barrier layer material as recited in Claim 1. In contrast, Figure 3D of Hashimoto shows that the layers 20 and the solder balls 26 are maintained on the chromium layers 16.

For at least the reasons discussed above, the Applicants respectfully submit that Claim 1 is patentable over Hashimoto. Moreover, Claims 36, 48, and 53 are patentable over Hashimoto for reasons similar to those discussed above with respect to Claim 1. In addition, Dependent Claims 2-23, 37-47, 50-52, and 54-64 are patentable at least as per the patentability of Claims 1, 36, 48, and 53 from which they depend.

CONCLUSION

Accordingly, the Applicants submit that all pending claims in the present application are in condition for allowance, and a Notice of Allowance is respectfully requested in due course. The Examiner is encouraged to contact the undersigned attorney by telephone should any additional issues need to be addressed.

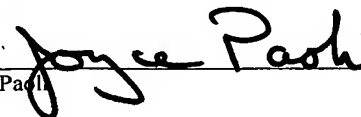
Respectfully submitted,


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I hereby certify that this correspondence is being deposited with the United States Postal Service with sufficient postage as first class mail in an envelope addressed to: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450 on October 26, 2005.


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